

Senior Kinetic Modeller

Tulum Energy is an early-stage technology company developing an innovative Turquoise Hydrogen pyrolysis solution for clean and inexpensive hydrogen production. Our platform technology will have a major impact in our world's attempt to decarbonize by reducing greenhouse gas emissions. As we race towards this critical goal, we are building a team of world class individuals that are comfortable working at a start-up company, are innovators and have a passion for climate change.

We are currently looking for a **Senior Kinetic Modeller** to help develop and mature Tulum's current and alternate Pyrolysis Reactor Concepts to achieved Key Performance Indicators (KPIs). In this role you report directly to the Chief Technical Officer. Specific details are below.

Primary Responsibilities:

- Lead the development of subsystem and network system models, both reacting and non-reacting, steady and/or unsteady, to explore, optimized and evaluate reactor concepts and permutations based around Tulum's proprietary, plasma-based pyrolysis technology to achieve key performance metrics including mixing uniformity, optimal hydrogen and carbon yields, carbon morphology, etc.
- In concert with strategic partners, develop, optimize and integrate imbedded solid carbon sub-models ("Sectional" or the like) to quantify and optimize carbon morphology and off design performance
- Perform detailed thermal, combustion, mass and energy balance analyses and calculations to support concurrent modelling activities and experimental test campaigns
- Support the design, assembly and testing of a lab scale, proof of concept thermal reactor/combustion systems and use the results to calibrate concurrent analytic models (both CFD + Kinetic)
- Help generate key Intellectual Property for the company to increase its Patent Portfolio and technology protection

Minimum Experience:

- PhD in Mechanical Engineer Degree (or equivalent) with 12+ years relevant experience in the modelling of thermal, reacting fluids systems including, but not limited to, reactors, oxidizers/combustors, gasifiers, gas turbine combustion systems, boiler burners, process heaters, rockets, etc.
- Solid understanding of Methane Pyrolysis, specifically Turquoise Hydrogen Production, and in the design and modelling of Methane Pyrolysis reactors and associated subsystems
- Thorough understanding of thermodynamics and reacting and non-reacting fluid dynamic flows including, but not limited to the following:
 - Premixed and Diffusion flames
 - Reaction Kinetic Mechanisms (reduced order)
 - High Speed flow
 - Conjugate heat transfer
 - Advanced Fuel-air mixing concepts and optimization
 - Gas Fuel Injections
 - Swirling flows
- Advanced expertise in a variety of kinetic and equilibrium solvers as Cantera, Ansys Chemkin, Gaseq, or the like
- Experience with reduced order kinetic model integration into CFD solvers
- Provide accurate and detailed reports of CFD results
- Exceptional communication skills both written and verbal; ability to present results in front of a group of peers
- Support Design Team in product design and development activities
- Ensure that product design and performance meets technical and functional requirements
- Ability to work independently and as part of a team
- Mechanical aptitude, hands on, and the desire and capability to lead a team if needed

Additional Experience Desired:

- Intermediate expertise in a variety of CFD solvers including Ansys Fluent, CD Adapco, CFX, Open Foam, or equivalent
- Ability to read and interpret CAD and P&IDs drawings
- Experience with CAD packages such as CATIA, Solid Works, AutoCAD, CREO or the like and associated GD&T standards

- Hands on experience using and operating flammable gases and operating combustion test rigs including data analysis and processing
- Experience with both high and low speed instrumentation (dynamic pressure and temperature sensors), flow meters, regulators, etc.
- Experience with process control system hardware and DAQ software (DCS, HMI, PLC, National Instruments)
- Versed in such software and programming tools as MATLAB, Python, C++, or the like

Location

The position is preferably based in Milan Italy, but some remote working arrangements will be considered with periodic visits to Milan as needed.

Tulum Energy

Tulum Energy is an early stage and dynamic Start-up Company. Our Standard employment package includes a base salary, Stock Options, Vacation and Health Insurance. For the current opening:

- Salary Range: \$80,000-\$120,000
- Permanent Full-Time Position